ENGINEERING CHANGE NOTICE

Page 1 of 2

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12. Description of Change

Minor revisions were made to the Table of Contents to reflect Attachment 9, "Field Column Leach Testing for 200-BP-1 Safety Assessment." Attachment 9 has been added to provide an assessment for field column leach testing activities.

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7. Abstract

This revised document presents an assessment of the potential hazards and consequnces associated with the removal of contaminated soil from the 216-B cribs in the 200 East area of the Hanford Site. The activities were found to present a low hazard. The document also presents safety functions to be considered in the project and recommendations regarding appropriate controls to be employed in the project activities.

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Safety Assessment for 200-BP-1, Task 4

CHANGE CONTROL RECORD

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		(5) Cog. Engr.	(6) Cog. Mgr. Date
OA	(7) Revisions have been made to pages iii, 30, 31, 32, and 33. Sections 4.1, 4.2, and 4.3 have been deleted; these sections have been replaced with Attachment 8 (Section 4.0). Minor editorial changes were made to the references (Section 5.0) and to the Table of Contents. Attachment 8 has been added that provides a safety assessment for 200-BP-1 Task 2.	M.A. Buckmaster 7/8/92	R.A. Carlson
OB RS	Minor revisions have been made to page iii (Table of Contents) to reflect Attachment 9. Attachment 9 has been added that provides a safety assessment for field column leach testing activities.	M.A. Buckmaster 7/8/92	R.A. Carlson 7/8/92

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CONTENTS

ATTACHMENT 9
FIELD COLUMN LEACH TESTING FOR 200-BP-1 SAFETY ASSESSMENT

CONTENTS

1.0 INTRODUCTION

This safety assessment documents the analysis of hazards for the field column leach testing activities at the 200-BP-1 operable unit in the 200 East Area. The assessment includes an evaluation of operational safety procedures and potential hazards that may be encountered. The leach testing activities are found to be of minor hazard, primarily to the site worker, and are conservatively classified low hazard.

The U.S. Environmental Protection Agency (EPA) has taken action to include the 200 Areas at the U.S. Department of Energy (DOE) Hanford Site on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The 200-BP-1 is one of several CERCLA operable units identified with the 200 East Area. The Westinghouse Hanford Company (Westinghouse Hanford) will perform various characterization activities in the inactive soil column disposal units of the 216-B cribs for the DOE with agreement of the EPA and the Washington State Department of Ecology (DOE-RL 1990).

1.1 WORK DESCRIPTION

This assessment records the hazards and operational limitations to assure safe operation of field leach testing of soil samples extracted from the 216-B cribs. The soil samples will be packaged and delivered to a mobile field trailer, where the column leach testing will be performed. The leach testing will be performed on the work site of the 200-BP-1 operable unit.

Two soil samples from each crib will be packaged in a specialized leach test sample container. One sample will contain soil from the most highly contaminated zone and the other from an area of minimal contamination below the highly contaminated zone. The samples will be packaged into teflon columns approximately 2 in. (5 cm) in dia by 5 in. (13 cm) long (volume, 257 cm^3). A representation of a test column is provided in the Attachment.

The column leach tests will be performed in a dual axle field trailer having the approximate dimensions of 7 ft (2.1 m) wide, 14 ft (4.3 m) long, and 7 ft (2.1 m) high. The field trailer will be self-supported and equipped with minimal services and utilities. A portable gasoline powered generator (120/240 V at 30 A with approximately a 12 gal (45 L) gasoline supply) will power the lights, box air conditioner, baseboard heaters and outlets. The field trailer will contain an elevated water reservoir for the field test which will provide the water and static head needed for the leach test. Also included is a small volume electric air pump (15 PSI) to provide additional water pressure as needed. The trailer will contain a limited quantity of glass containers used for leach water collection and if required, a small area for storing leach water samples. Small quantities of chemical preservatives for the leach water samples will likely be stored in the field trailer.

The test procedure involves leaching .26 to .4 gal (1 to 1.5 L) of water through the highly contaminated soil sample. A portion of the leached water

will be collected and shipped to an analytical laboratory for analysis. The remaining water will be leached through the soil sample of minimum contamination, collected, and again provided to an analytical laboratory for analysis to verify the ionic capacity of the soil. Additional information regarding the leach test procedure is provided in the *Geotechnical Engineering Manual* (WHC 1990).

2.0 HAZARD INVENTORY

The inventory of concern is that which potentially may contain substances harmful to individuals or the environment. The potential inventories are those that will be extracted from the characterization activities extracted from cribs 216-B-43, -44, -45, -46, -47, -48, -49, 50, and -57. Soil samples will be taken from crib 216-B-61; however, this crib is not expected to be contaminated because there is no evidence that the crib received any contaminated discharges. The crib inventories have been evaluated in safety assessments for 200-BP-1 Tasks 2 and 4 (WHC 1991, Attachment 8). The controlling hazardous substances regarding the safety and health of individuals are ferrocyanide salt compounds, radionuclides, and unknown volatile substances (WHC 1991, Attachment 8). The prudent actions and operational safety limits (OSL) provided (WHC 1991) are effected to control and limit the hazardous substances which will be handled by site personnel.

The leach test inventory of hazard substances is part of the overall inventory for Tasks 2 and 4. The hazard classification of low hazard consequently bounds the previous minimum review and authorization determination.

The conditions evaluated deal with limited space issues of the field trailer and are focused primarily at the site worker. The degree of hazard is controlled by the radiological content and the unknown organic content of the packaged soil samples. The controlling radionuclide concentrations are the worst case postulated under the scope of work and are provided in Westinghouse Hanford (1991, Attachment 8). The maximum inventory volume of 5 soil leach column samples is 1,285 cm^3 (257 cm^3 each). Table 1 provides a summary of the worst case radiological inventory for the field trailer.

Table 1. Field Trailer Worst Case Radionuclide Inventory.

Radionuclide	Concentration (uCi/cm^3)	Accumulation (uCi)
^{90}Sr	9.08E+0	1.17E+4
^{137}Cs	5.12E+0	6.58E+3
^{239}Pu	8.03E-3	1.03E+1
^{240}Pu	2.17E-3	2.79E+0
^{238}U	4.48E-4	5.76E-1

The radiological inventory represents a potential low hazard as an airborne contaminant source should the leach column become breached. The inventory also is a source for potential external radiation exposures.

The nonradiological contaminants have been determined to be less limiting than the radionuclides, with one exception: volatiles from potential ferrocyanide salts and unknown organic compounds present a potential compatibility issue. The worst case soil contaminants may react with acid solutions and consequently give off volatile gases. As a precaution, acid solutions are prohibited from the vicinity of the soil samples to mitigate that risk (WHC 1991).

3.0 HAZARD ASSESSMENT

The potential airborne hazard associated with the field trailer for column leach testing is similar to that assessed for the sample preparation trailer in *Safety Assessment for 200-BP-1, Task 4* (WHC 1991). The differences are the volumes of contaminated soil. The volumes in the leach test trailer are approximately a factor of 2 less than in the sample preparation trailer. Additionally, the sample is normally contained in the leach test columns. The water pressure in the leach test trailer also may provide a limited energy source to release the contaminants under certain accident or upset conditions.

The leachate test water is a potential minor hazard. Leachate from the more highly contaminated soil sample is expected to collect significant portions of the contaminants in the soil sample. The portion of leachate that is analyzed from the more highly contaminated sample will likely contain low levels of radionuclides and chemical substances. The residual leachate from the first test column is expected to be cleaned in the second (least contaminated) test column.

The leachate processed from the first (most contaminated) test column is considered a minor hazard to the site worker handling the leachate. The anticipated contaminated leachate is a potential source of skin contamination. The source potential of the leachate concerning inhalation and external radiation is negligible because of the aqueous nature of the source.

The worst case exposure to a worker would be a total loss of contaminants from all test columns. The maximum postulated airborne contaminant concentrations are derived from a hypothetical uncontrolled clean up or sweeping of the spilled contamination. The assessments provided in Westinghouse Hanford (1991) found that the worst case radiological consequence to an individual in the sample preparation trailer would be an inhalation exposure of 3 rem. The likelihood of a total loss or spill of the contaminated soil materials in the leach test trailer is less than the sample preparation (packaging) trailer because the test columns normally contain the contaminants. The test columns will not be intentionally opened in the trailer.

Potential exposures resulting from a spill of the worst case sample inventories in the sample preparation trailer to uninvolved individuals were also assessed in Westinghouse Hanford (1991). The potential unmitigated consequences were found to be an acceptable risk. Because the field trailer for the soil column leach tests are of less volume, of comparable contaminant concentrations, and are less likely to be released, the conclusion of acceptable risk applies to the leach testing activities.

Upsets or spills could occur from the handling activities with the leachate. The leachate is not an eminent health and safety issue, but the response to spills (if they occur) will be rapid. Work procedures for the leach test trailer will specify the appropriate actions and responses.

The worst case consequences (airborne release of contaminants) represent an acceptable risk for the 200-BP-1 field column leach testing activities.

4.0 ASSESSMENT SUMMARY

The potential consequences associated with the soil column leach tests for the 200-BP-1 cribs are classified low hazard. Potential airborne releases are hazardous primarily to the site worker in the limited space of the field trailer. Additionally, the site worker handling test columns containing radionuclides will receive limited external radiation exposure. Specific external radiological exposures will be calculated to determine the appropriate handling and shielding requirements. These requirements will be included in specific radiation work permits and site safety plans as appropriate to ensure that exposures are controlled as low as reasonably achievable (ALARA) and comply with the occupational safety requirements of Westinghouse Hanford (1987, 1988a, 1988b).

The prudent actions and operational safety limits (OSL) in Westinghouse Hanford (1991) provide the assurances necessary to control the work and ensure the safety and health of the uninvolved individual. They also provide insight to prudent actions appropriate for the protection of the site worker. An additional prudent action for the protection of the worker involved with the leach testing is provided in Section 4.1.

4.1 PRUDENT ACTION

Special handling procedures for leach water preservatives will be included in the work procedures for the leach column testing field trailer. Soil samples potentially contaminated with ferrocyanide salts can produce volatile gases in contact with acids. The procedures will ensure that if acid preservatives are required, they will be controlled to assure they do not come in contact with the potentially incompatible samples. This prudent action mitigates the risks of volatile reactions of potentially incompatible

substances and assures potential exposures to the site worker will be maintained ALARA.

5.0 REFERENCES

DOE-RL, 1990, *Remedial Investigation/Feasibility Study Work Plan 200-BP-1 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL 88-32, Rev. 1, U.S. Department of Energy, Richland Field Office, Richland, Washington, March 1990.

WHC, 1987, *Industrial Safety Manual*, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988a, *ALARA Program Manual*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.

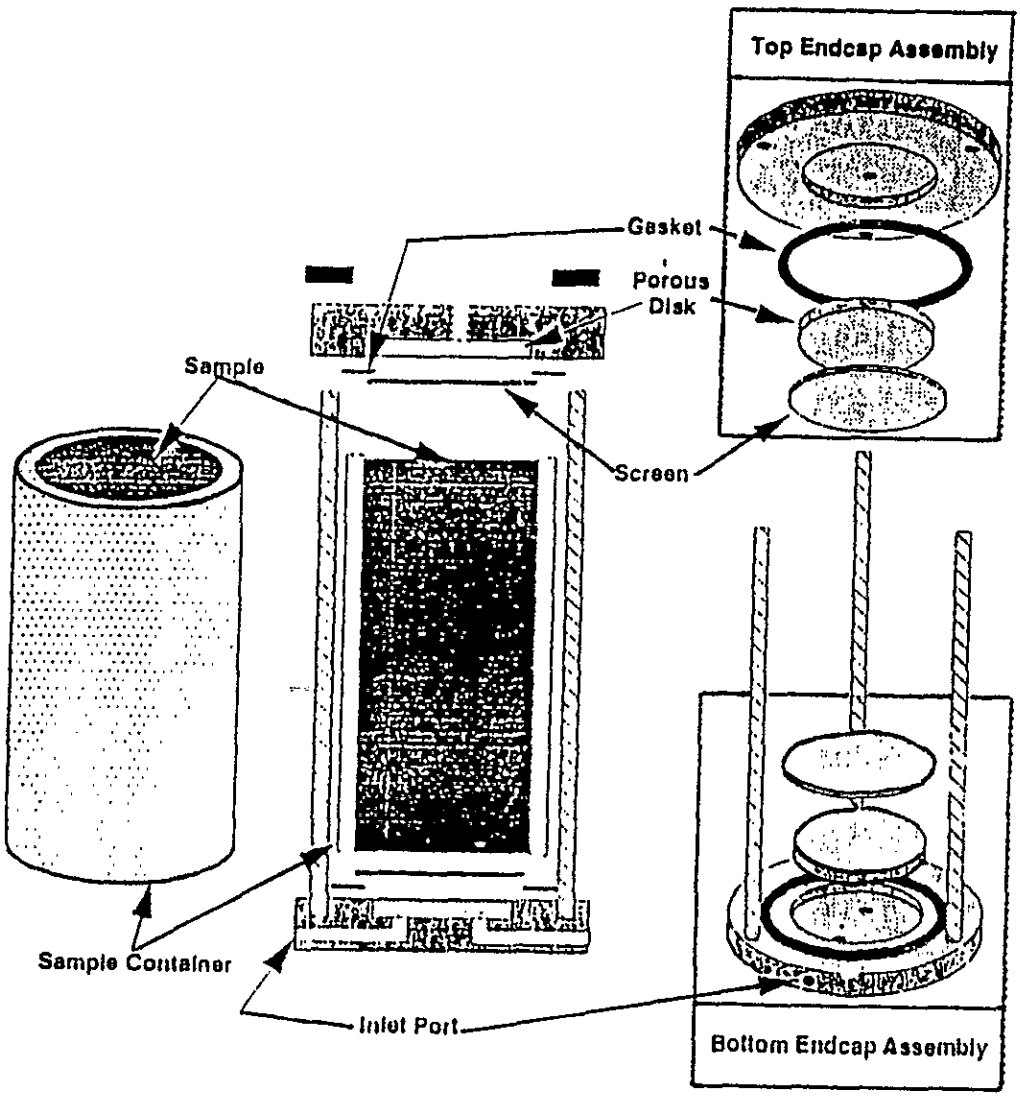
WHC 1988b, *Radiation Protection Manual*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *Geotechnical Engineering Manual*, WHC-IP-0635, GEL-22, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991, *Safety Assessment for 200-BP-1, Task 4*, WHC-SD-EN-HC-004, Rev. OA, Westinghouse Hanford Company, Richland, Washington.

Attachment

Assembly of Undisturbed Sample Column Leach Apparatus.



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